

# Cancer Research



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## ARTICLES

### Formation of cyclic 1,N2-propanodeoxyguanosine adducts in DNA upon reaction with acrolein or crotonaldehyde

**FL Chung, R Young and SS Hecht**

Acrolein reacted with deoxyguanosine at pH 7 and 37 degrees to give three major products, Adducts 1 to 3, which were separated by high-performance liquid chromatography. They were identified by their ultraviolet, mass, and nuclear magnetic resonance spectra, by the spectra of the corresponding guanine derivatives, and by chemical transformations. Adducts 1 and 2 were two rapidly equilibrating diastereomers of 3-(2-deoxy-beta-D-erythro-pentofuranosyl)-5,6,7,8-tetrahydro-6-hydroxypyrimido[1,2-a]purine-10(3H)one, and Adduct 3 was 3-(2-deoxy-beta-D-erythro-pentofuranosyl)-5,6,7,8-tetrahydro-8-hydroxypyrimido[1,2-a]purine-10(3H)one. Adducts 1 and 2 were formed by Michael addition of N-1 of deoxyguanosine to C-3 of acrolein, followed by ring closure between N2 of deoxyguanosine and C-1 of acrolein. Adduct 3 was formed by ring closure in the opposite direction. Adduct 3 was analogous to the major crotonaldehyde-deoxyguanosine adducts which were previously characterized. Adduct 3 (0.2 mmol/mol DNA-P) or the corresponding crotonaldehyde adduct (0.03 mmol/mol DNA-P) was formed when either acrolein or crotonaldehyde was allowed to react with DNA at pH 7 and 37 degrees. These results demonstrate that cyclic 1,N2-propanodeoxyguanosine adducts are formed by reaction of acrolein and crotonaldehyde with DNA.

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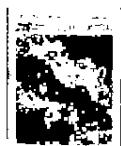
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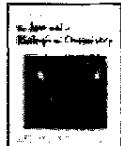
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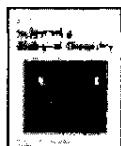
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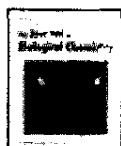
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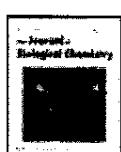
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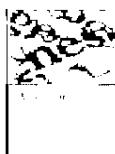
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